DOCUMENT RESUME

ED 387 506 TM 023 666

AUTHOR Pack, Albert R.; Michael, William B.
TITLE A Comparison of Two Methods of Data Collection in Analyzing Social and Cognitive Play Behavior.
PUB DATE Apr 95
NOTE 24p.; Paper presented at the Annual Meeting of the American Educational Research Association (San Francisco, CA, April 18-22, 1995).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Behavior Patterns; Cognitive Development; Comparative Analysis; *Data Collection; Interviews; *Kindergarten Children; *Observation; Outdoor Activities; *Play; Primary Education; Research Methodology; Social Development

ABSTRACT

This study investigated the extent to which data collected on play behavior differ when two different data collection methods, observation alone and observation plus interview, were used. A secondary objective was to compare data collected using both methods in an indoor and outdoor play environment. The social and cognitive play behavior for a sample of 30 kindergarten children was recorded using the observation only and observation/interview procedures. Results showed that the combined methodology of observation with follow-up interview provided a profile of the play behavior of kindergarten children different from the profile when observation is used alone. The combined methodology suggests that less functional play and more dramatic play is recorded when the observation/interview technique is used than when the observation only technique is used, especially in the outdoor environment. In a comparison of indoor to outdoor play, the indoor environment appears to facilitate constructive play and outdoor environments seem to facilitate functional play. More solitary and parallel play occurs indoors, while more group play takes place outdoors. Dramatic play for children at this age level appears to be facilitated equally by both indoor and outdoor environments. (Contains 2 tables and 20 references.) (Author/SLD)

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A Comparison of Two Methods of Data Collection in Analyzing Social and Cognitive Play Behavior

Albert R. Pack
North Kitsap School District, Poulsbo, WA
William B. Michael
University of Southern California

Paper presented at the annual meeting of the
American Educational Research Association

April 1995
San Francisco, CA

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Abstract

This study investigated the extent to which data collected on play behavior differ when two different data collection methods are utilized. The two methods of data collection compared were observation only and observation/interview. A secondary objective was to compare data collected utilizing both methods in an indoor and outdoor play environment. The social and cognitive play behavior for a sample of 30 kindergarten children was recorded utilizing the observation only and observation/interview procedure. Results showed that the combined methodology of observation with follow-up interview provides a profile of the play behavior of kindergarten children different from that when observation is used alone. The combined methodology suggests that less functional play and more dramatic play is recorded when the observation/interview technique is used than when the observation only technique is used, especially in the outdoor environment. In a comparison of indoor to outdoor play, the indoor environment appears to facilitate constructive play and outdoor environments seem to facilitate functional play. More solitary and parallel play occur indoors, while more group play takes place outdoors. Dramatic play for children at this age level appears to be facilitated equally by both indoor and outdoor environments.

A Comparison of Two Methods in Analyzing
Social and Cognitive Play Behavior

Observational studies of children's play have frequently focused on its social and cognitive aspects. Studies concentrating on the social aspects of play generally have used categories developed by Parten (1932), which include solitary, parallel, associative, and cooperative play behavior. Studies describing the cognitive aspects of children's play often have used categories developed by Piaget (1962) and elaborated by Smilansky (1968). These cognitive dimensions have included functional, constructive, dramatic play in addition to games with rules. Rubin combined Parten's social participation scale and Smilansky's cognitive play categories into a single instrument, allowing both dimensions of play to be assessed simultaneously (Rubin, Maioni, & Hornung, 1976).

The combined social and cognitive observation scheme appears as a dominant framework for the study of play. Examples of its use in recent research have included study of the effects of playground design (Campbell & Frost, 1985), study of the effects of spatial density on play (Liddell & Kruger, 1989), a comparison of same-age and mixed-age preschool classrooms (Roopnarine, et al., 1992), and effects of time in day care (Schindler, Moely, & Frank, 1987). This highly cited classification scheme, often referred to as the social/cognitive scale, has been used in a variety of other studies to investigate age trends in play behavior as well as to study correlations between different forms of play and measures of social-cognitive development (Rubin, Fein, & Vandenberg, 1983).

Although Christie and Johnson (1989) have indicated that the use of a common play scale has facilitated the comparison of results across studies, the social/cognitive scale has been criticized by others. Takhvar and Smith (1990) agreed that the nested social/cognitive hierarchy dominates as a framework for the study of play, but stated that one of the problems with its use is deciding when play is observed to be dramatic, constructive, or functional. The observer must make inferences about behavior when dramatic and constructive intent of any observed play behavior refers to concepts in the mind of the player.

As noted, a weakness in observational studies of play is that an inference is required by the observer in determining the content of the child's play being observed. For example, in a hypothetical observational

study using the social/cognitive scale, an observer might watch a child stacking blocks. If the child's intention was to create something, the play would be classified as constructive. If the child's intention was to pretend the stack of blocks was a castle, the content of play would be categorized as dramatic. The problem is that definitions for the various categories of play refer to concepts in the mind of the player, which cannot always be determined by an observer. The validity of observational inferences about play is open to question.

The possibility of using interviews with children to supplement direct observation has been suggested as a way to overcome the problem of observer inference regarding the intent of play. Smith, Takhvar, Gore and Vollstedt(1985) conducted a pilot study and found that 3- and 4-year olds could give sensible replies when asked what they were doing after an observed episode of play. In related research they found that after observers were trained to 90% agreement using Smilansky's categories, there was only 34% agreement when observation data were compared with data that were generated on the same subjects by experimenters using an observation/interview procedure. Experimenters employing the interview procedure recorded higher rates of dramatic play than did experimenters who made observations alone. In conducting a review of literature, these investigators could find no other studies utilizing the observation/interview procedure to study play.

Aside from the issues relating to the categorization and measurement of play, there is a need to study the effects of environmental variables on children's play. In early childhood education the environment embodies an important aspect of the curriculum. Dempsey and Frost (1993) indicated that arranging the physical, social, and temporal aspects of the environment is a primary role of the teacher. Current perspectives on education have viewed the learner as instrumental in learning, as interactive with the environment and place a heavy reliance on hands-on experience. In this view of early childhood development and education, the environment is the interface between the teacher and the child. The teacher arranges the environment to which the child brings the capacity to learn through play. As a result, study of the play environment in early childhood education is an area of increasing concern.

A review of literature conducted by these investigators indicates a paucity of research on the cognitive and social play behaviors of children in outdoor environments. Only one study conducted by Henniger (1985) has been done to compare children's play indoors and outdoors. The lack of studies dealing with these issues indicates a need for research in this area.

To ascertain the extent to which differences were noted when children's play was categorized along social and cognitive dimensions this study compared two different observational techniques. The techniques compared were data collection utilizing an observation only method and a data collection method utilizing observation with a follow-up interview. Although the vast majority of previous studies on children's play has employed the observation only method to code and collect data, the current study applied a combination of open-ended interviews after an observation of behavior in an attempt more clearly to categorize the play behavior of young children. Based on the assumption that self-reports of children are accurate indicators of the content of their play behavior, a comparison was made between the data obtained with the observation-interview technique and the data obtained utilizing observation only to assess what differences exist.

A secondary objective was to identify the possible effects of an outdoor play environment on the play behavior of children and to ascertain the differences between the indoor and outdoor play behavior of children. Both the observation only and the observation/interview techniques were utilized to categorize play behavior along social and cognitive dimensions in making comparisons.

The role of play in early childhood development and education is a topic of considerable interest to both policy makers and practitioners. Further study is required to clarify how play is developmentally relevant to curriculum planning and development for early childhood education. The demonstration of a dual-method measurement technique utilizing both observation and interview information could have important implications in interpreting previous information accumulated on play. It would also inform practitioners about a more nearly accurate measurement strategy for play-based assessment as well as shape the practice of future observational research on play in early childhood.

Analysis of the differential effects of indoor and outdoor play environments on children's play behavior is essential for a comprehensive

understanding of the relationship between play and development. The comparison of children's play indoors with play outdoors will provide useful information to guide practitioners in the field of early childhood education in selecting play environments that are valuable in stimulating various play behaviors related to cognitive and social development.

Method

Subjects

The social and cognitive play behaviors were observed on a total of 30 children from a kindergarten classroom. The children were predominantly Caucasian and from an elementary school in a rural area. English was the only language spoken in the classroom. The sample consisted of 13 males and 17 females. The mean age for the entire sample was 71 months with a range of 65 months to 84 months.

Measures and Data Collection Procedures

The play behaviors of children were observed and recorded utilizing the social/cognitive play matrix developed by Rubin (Rubin et al., 1983). Rubin et al. (1976) provided definitions so as to give one defining criterion for each category of play defined as follows:

1. Functional play. - Repetitive muscle movements with or without objects.

2. Constructive play. - Manipulation of objects such as blocks or modeling clay to construct or to create something; putting a puzzle together

3. Dramatic play. - Role playing and/or activities of make believe transformations.

4. Games with rules. - Recognition and acceptance of conformity with pre-established rules.

Rubin, Watson, and Jambor (1978) condensed categories and defined the social categories of play as follows:

1. Solitary play. - Playing alone with materials different from those of children within speaking distance; no conversation with others.

2. Parallel play. - Playing with toys or engaging in activities similar to those of other children who are in close proximity; however, there is no attempt to play with other children.

3. Group play. - Playing with other children; roles may or may not be assigned.

4. Unoccupied/Onlooker/Transition. - Unoccupied behavior, onlooker behavior, moving from one activity to another.

An additional category has been added to the matrix to enable recording nonplay behavior occurring during free-play periods. This category has been defined by Johnson, Christie, and Yawley (1987) as follows:

Nonplay Activities. - Activities which must conform to a pre-established pattern, as in academic activities, teacher assigned tasks. Activities involving coloring books, worksheets, and computers were considered as nonplay in nature. Looking at books, having a snack, and feeding the hamster could also be considered as nonplay activities.

The unit of measurement was a 15 second observation of play behavior taken on a rotating basis for a total sample of 30 kindergarten students. The primary mode of play occurring during each 15 second observation interval counted as one unit of measurement and was categorized into one of the twelve social-cognitive dimensions.

Four identical observation sheets were prepared for each child in the study. Each sheet incorporated a two dimensional grid format, with a separate box for each of the 12 play categories as well as the two categories of nonplay behavior. The four observation sheets were used in the four different data collection conditions: (1) indoor - observation only, (2) indoor - observation/interview, (3) outdoor - observation only, (4) outdoors - observation/interview. The children were observed during regularly scheduled indoor and outdoor play periods.

The multiple scan sampling procedure developed by Roper and Hinde (1978) was utilized. An observation period of 15 seconds was determined to allow enough time for the observer to determine what type of play was occurring, while being brief enough to be unlikely that the type of play would change during one observation period. If more than one type of play was observed during a 15 second observation, the type of play occurring for the majority of the 15 second observation period was recorded. The sampling system worked by shuffling the recording sheets before each observation session to establish a random order for the observations. The child whose sheet was on top was observed for a period of 15 seconds and then a tally mark

was placed in the box corresponding to the category of play observed. After a child had been observed and his play behaviors coded, the sheet was placed at the bottom of the stack. The child whose sheet appeared next was observed and coded. If time during the observation period allowed, this sequence was repeated until all the children were observed, at which point the sequence was repeated. This procedure continued on subsequent days until each child had been observed at least 10 times indoors and 10 times outdoors in both data collection conditions.

In the second phase of the study the same multiple-scan procedure was utilized in both the indoor and outdoor environment, but all observations were followed up with a question to the child being observed regarding the content of his or her play along the cognitive dimensions.

Three observers collected data. In order to establish interrater reliability the observers initially met to study the observation sheets and to discuss the observation categories and their definitions. Observational data was collected on separate occasions by paired observers until coder agreement reached 80%.

Data Analysis

The data analysis began with a tally of the number of play behaviors each child exhibited for each of the play categories in both the indoor and outdoor environment for both data collection procedures, observation only and observation/interview. The unit of measurement was the number of 15 second intervals each play behavior occurred during each data collection condition. The primary mode of play occurring during each 15 second observation interval was categorized into one of the twelve social-cognitive dimensions or two nonplay dimensions. For example, if during a 15 second observation period a child was observed making a block structure with other children, it would be counted as one unit of group constructive play. The mean number of observations for each of the twelve social-cognitive play categories and aggregated data for the separate social and cognitive categories were then computed for both environments and both observation procedures for the total sample. These means of data collected in both procedures and environments were compared for significant differences by using a two tailed t-test for dependent means. This study was exploratory with no directional hypotheses.

Results

In Table 1 observational data are compared separately for the indoor and outdoor environment when the observation only and observation/interview methods of data collection are used.

In the indoor environment three significant differences were noted between the mean number of 15 second intervals in which each play behavior was observed for each of the social-cognitive play categories when a comparison of data collected by observation only was made with data generated by observation/interview. These significant differences included functional-solitary play, $t(29) = -2.523$, $p<.05$, constructive-group play, $t(29) = -2.850$, $p<.01$, and dramatic-group play, $t(29) = 3.336$, $p<.01$. When the aggregated data are considered a significant difference was revealed only in dramatic play, $t(29) = 2.476$, $p<.01$. In addition, there was a significant difference in the mean number of nonplay activities observed, $t(29) = -2.140$, $p<.05$.

In the outdoor environment significant differences were noted between data collected that were associated with the two procedures: (a) utilizing the observation only method and (b) employing the observation/interview method in functional-group play, $t(29) = 2.632$, $p<.05$, in constructive-group play, $t(29) = -2.192$, $p<.05$, and in dramatic-group play, $t(29) = 3.633$, $p<.01$. When the data were aggregated for the social and cognitive categories across both data collection methods a significant difference was revealed in the social categories of parallel play, $t(29) = -4.469$, $p<.01$, and of group play, $t(29) = -2.186$, $p<.05$. In the cognitive categories significant differences were revealed in functional play, $t(29) = -4.510$, $p<.01$, and dramatic play, $t(29) = 3.862$, $p<.01$. A significant difference between the two methods (observation and observation/interview) of data collection was also shown in nonplay activities, $t(29) = -2.523$, $p<.05$.

In Table 2 the mean number of 15 second observations of play behavior in each of the social and cognitive play categories is listed along with t tests indicating significant differences between indoor and outdoor play for the observation only and observation/interview data collection methods.

In the observation only method of data collection significant differences were shown between indoor and outdoor play in the social-cognitive categories of functional-parallel, $t(29) = 4.334$, $p<.01$, functional-group, $t(29) = 6.960$, $p<.01$, constructive-solitary, $t(29) = -3.568$, $p<.01$, constructive-parallel, $t(29) = -5.013$, $p<.01$, constructive-group, $t(29) = -2.786$,

$p<.01$, dramatic-parallel, $t(29) = -2.112$, $p<.01$, and games-group, $t(29) = 6.279$, $p<.01$. In the aggregated data comparing indoor and outdoor play for the observation only condition yielded significant differences in the mean number of 15 second observations in all the social categories: solitary, $t(29) = -3.286$, $p<.01$, parallel, $t(29) = -2.726$, $p<.01$, and group, $t(29) = 6.071$, $p<.01$. For the aggregated data of the cognitive categories significant differences were noted in functional play, $t(29) = 7.581$, $p<.01$, constructive play, $t(29) = -7.374$, $p<.01$, and games with rules, $t(29) = 6.559$, $p<.01$. Using the observation only data collection method to compare indoor and outdoor play indicated a significant difference in the mean number of 15 second observations for the nonplay category of activities, $t(29) = -2.710$, $p<.01$.

In the observation/interview method of data collection significant differences were noted between the mean number of 15 second observations of indoor and outdoor play in the social-cognitive categories for functional-solitary $t(29) = 2.475$, $p<.01$, functional-parallel $t(29) = 2.693$, $p<.01$, functional-group $t(29) = 5.887$, $p<.01$, constructive-solitary $t(29) = -4.572$, $p<.01$, constructive-parallel $t(29) = -6.298$, $p<.01$, constructive-group $t(29) = -2.192$, $p<.05$, dramatic-solitary $t(29) = -4.080$, $p<.01$, dramatic-group $t(29) = 3.148$, $p<.01$, and games-group $t(29) = 6.071$, $p<.01$. Comparisons among the aggregated data showed significant differences in the social categories of solitary $t(29) = -4.469$, $p<.01$, parallel $t(29) = -3.754$, $p<.01$, and group $t(29) = 8.472$, $p<.01$ as well as in the cognitive categories of functional $t(29) = 5.543$, $p<.01$, constructive $t(29) = -8.651$, $p<.01$, and games with rules $t(29) = 6.071$, $p<01$. In the nonplay observations significant differences were noted in both categories of activities $t(29) = -3.120$, $p<.01$ and of unoccupied $t(29) = -2.065$, $p<.01$.

Discussion

With respect to how indoor play varied along social and cognitive dimensions when data collected by observation only were compared to data collected with the observation/interview technique, no significant differences were noted among the three aggregated social categories. In a comparison of the two methods of data collection for the aggregated cognitive categories, the only significant difference revealed was that more dramatic play was recorded by the observation/interview method. When the aggregated observations were divided into the twelve possible social-cognitive subcategories, three significant differences noted were in functional-solitary,

Table 1

Means of the Number of 15 Second Intervals in Which Each Play Behavior Occurred
A Comparison of Data Collection Methods in the Indoor and Outdoor Environment
Including Two-Tailed t Tests for Dependent Means Showing Significnat Differences

Social-Cognitive Play Category	Observation Only Indoor	Observation/ Interview Indoor	t	Observation Only Outdoor	Observation/ Interview Outdoor	t
Functional-Solitary	0.83	0.53	-2.523 *	1.27	1.17	-1.191
Functional-Parallel	0.37	0.47	0.571	1.20	0.73	-1.613
Functional-Group	0.17	0.03	-1.682	1.67	1.03	-2.632 *
Constructive-Solitary	1.70	1.03	0.797	0.27	0.47	0.619
Constructive-Parallel	1.33	1.43	0.722	0.23	0.10	-1.278
Constructive-Group	0.97	0.43	-2.850 **	0.40	0.17	-2.192 *
Dramatic-Solitary	0.43	0.83	1.795	0.10	0.17	-0.273
Dramatic-Parallel	0.20	0.13	-0.812	0.00	0.03	0.00
Dramatic-Group	1.83	2.57	3.336 **	2.30	3.63	3.633 **
Games-Solitary	0.00	0.00	-	0.00	0.00	-
Games-Parallel	0.00	0.00	-	0.00	0.00	-
Games-Group	0.00	0.00	-	1.47	1.30	-0.593
Solitary-Aggregate	2.97	3.03	0.542	1.63	1.80	0.862
Parallel-Aggregate	1.90	2.03	-0.091	1.43	0.87	-4.469 **
Group-Aggregate	2.97	3.03	0.645	5.50	6.13	-2.186 *
Functional-Aggregate	1.37	1.03		4.13	2.83	4.510 **
Constructive-Aggregate	4.00	3.53	0.244	0.40	0.70	-0.328
Dramatic-Aggregate	2.73	3.53	2.476 **	2.40	3.83	3.862 **
Games-Aggregate	0.00	0.00	-	1.47	1.30	0.72
Activities	1.10	0.70	-2.140 **	0.47	0.30	-2.523 *
Unoccupied	0.63	0.90	0.611	0.43	0.33	-0.441

*p<.05,**p<.01

Table 2

Means of the Number of 15-Second Intervals in Which Each Play Behavior Occurred: A Comparison of Indoor and Outdoor Play Utilizing Two Data Collection Methods Including Two-Tailed t Tests for Dependent Means Showing Significant Differences

Social-Cognitive Play Category	Observation/ Interview Indoor	Observation/ Interview Outdoor	t	Observation Only Indoor	Observation Only Outdoor	t
Functional-Solitary	0.53	1.17	2.475 *	0.83	1.27	1.819
Functional-Parallel	0.47	0.73	2.693 **	0.37	1.20	4.334 **
Functional-Group	0.03	1.03	5.887 **	0.17	1.67	6.960 **
Constructive-Solitary	1.03	0.47	-4.572 **	1.70	0.27	-3.568 **
Constructive-Parallel	1.43	0.10	-6.298 **	1.33	0.23	-5.013 **
Constructive-Group	0.43	0.17	-2.192 *	0.97	0.40	-2.786 **
Dramatic-Solitary	0.83	0.17	-4.080 **	0.43	0.10	-1.964
Dramatic-Parallel	0.13	0.03	-1.00	0.20	0.00	-2.112 **
Dramatic-Group	2.57	3.63	3.148 **	1.83	2.30	1.217
Games-Solitary	0.00	0.00	-	0.00	0.00	-
Games-Parallel	0.00	0.00	-	0.00	0.00	-
Games-Group	0.00	1.30	6.071 **	0.00	1.47	6.279 **
Solitary-Aggregate	3.03	1.80	-4.469 **	2.97	1.63	-3.286 **
Parallel-Aggregate	2.03	0.87	-3.754 **	1.90	1.43	-2.726 **
Group-Aggregate	3.03	6.13	8.742 **	2.97	5.50	6.071 **
Functional-Aggregate	1.03	2.83	5.543 **	1.37	4.13	7.581 **
Constructive-Aggregate	3.53	0.70	8.651 **	4.00	0.40	7.374 **
Dramatic-Aggregate	3.53	3.83	1.819	2.73	2.40	-0.705
Games-Aggregate	0.00	1.30	6.071 **	0.00	1.47	6.559 **
Activities	0.70	0.30	-3.120 **	1.10	0.47	-2.710 **
Unoccupied	0.90	0.33	-2.065 *	0.63	0.43	-0.779

*p< .05, **p< .01

constructive-group and dramatic-group play. Data collectors utilizing the observation only method recorded more functional-solitary and more constructive group play. In contrast, those utilizing the observation/interview method recorded more dramatic-group play than those utilizing the observation only method.

When the two modes of data collection are compared in relation to observational information collected outdoors, significant differences were noted in the aggregated cognitive categories of functional play and dramatic play. In addition, significant differences were noted in the aggregated social categories of parallel play and group play. Recorders in the observation only mode saw less aggregated dramatic play and more aggregated functional play than recorders in the observation/interview mode. Data collection utilizing the observation/interview method revealed more aggregated group play and less aggregated parallel play than the observation only method. Among the social-cognitive categories, significant differences were shown in functional-group play, constructive group play, and dramatic group play. Recorders utilizing the observation only method indicated more functional-group play while showing less dramatic group play and constructive group play.

These results appear to be consistent with the only other study located that compared observation and observation/interview methods of data collection. According to results reported by Smith, Takhvar, Gore, and Vollstedt (1985), episodes of children's play were edited onto a videotape with recordings of interviews with the children made immediately after each episode. Another tape was prepared without the interviews. When data from observers were compared across data collection conditions, changes in classification varied, but never from constructive to functional and most commonly from functional or constructive to dramatic. The same trend from functional and constructive to dramatic was revealed in the current study. It is most apparent in the aggregated data from the observation/interview condition. When observation is combined with interview information, it appears that less functional play was recorded and more constructive and dramatic play was recorded. When the aggregated data are considered, it appears that functional play was replaced with dramatic play rather than constructive play when an interview was added to observation.

Because much previous research has relied on the observation only method of collecting data on play, it may be that the amount of dramatic

activity in the play of children has been underestimated, whereas the amount of functional play has been overestimated. The implications of this finding are that the inclinations and abilities of kindergarten children to engage in symbolic activity are greater than commonly thought based on previous research findings.

One unexpected result was the significant differences between the two modes of data collection among the social aggregates in the outdoor environment. Data collection utilizing the observation/interview mode revealed significantly more parallel and group play than did data collection utilizing the observation only mode. One possible explanation may be that interactions and social proximities were noted when the data collection was done by circulating among the children while the observer asked questions about play behavior that were missed by a stationary observer.

Comparisons across both data collection conditions showed that children tended to engage in more function play outdoors than they did indoors. This trend was noted across all three social subcategories of functional play (functional-solitary, functional-parallel, functional-group). The outdoor play environment appears to be more conducive to large muscle sensory motor activities. The larger play area and less direct control or supervision offered two possible explanations. Although the indoor play environment affords the materials for constructive activities and the props for dramatic activities, it might be that the open spaces of the outdoor environment and the playground apparatus such as slides, climbing structures, and swings were variables that influenced higher levels of functional play outdoors. Another explanation might be that although teachers did not tolerate excessive gross motor activities in the classroom to maintain order and safely, they were more likely to accept and even to encourage these activities outdoors.

A comparison of the differential effect of the indoor and outdoor environments on constructive play suggests that constructive play occurs more often during indoor play. This trend holds across all social subcategories of constructive play including solitary, parallel, and group as well as the aggregated data on constructive play in both the observation only and observation/interview conditions. An explanation for this outcome may be that although materials for constructive play were available in the outdoor environment such as the sand box with buckets and shovels, there were considerably more materials for constructive play available in the indoor

environment. Subjective observation seemed to show that the teacher spent considerable time planning and providing constructive materials that were available in the classroom. For example, a variety of woodworking, craft and art materials was accessible to the children on a continuous basis during indoor free play. The availability of constructive material was much more limited outdoors.

Although data collected in the outdoor environment showed consistent results in that more functional and less constructive play observations were noted in the social subcategories (solitary, parallel, group); dramatic play yielded inconsistencies across the subcategories. More specifically, dramatic play did not follow the trend of functional and constructive play in that differences were noted between dramatic-solitary, dramatic-parallel, and dramatic-group play. More dramatic play was observed on a solitary and parallel level indoors in both the observation only and observation/interview conditions. In contrast, more group-dramatic play was observed outdoors, but a significant difference was noted only for the observation/interview data collection condition. When aggregated data on dramatic play are considered, there were no significant differences across either environment or data collection method.

The obtained results were in agreement with the findings of research by Henniger (1985) who compared the indoor and outdoor play of 4- and 5-year old children. He found that younger children engaged in more dramatic play indoors but that older children showed no significant difference in a comparison of indoor and outdoor dramatic play. Pellegrini and Boyd (1993) indicated that younger children were dependent upon realistic props, such as those found in a pretend kitchen, for dramatic play. Older children can engage in object substitutions by using less realistic props or no props at all in dramatic play. For example, an older child might rock an invisible baby in her arms and state " She's tired", while a younger child might not be able to accomplish this task without a doll. Given that the average age of the children in the current study was 5 years 10 months old, it is not unreasonable to expect that they could engage in dramatic activities as frequently outdoors as they did indoors even though props were not available outdoors.

The observations of play recorded in the category of games with rules offer an interesting contrast to data collected in the other categories. The only condition in which games with rules were observed was in the group situation

in the outdoor environment. No instances of games with rules were noted in the indoor environment and no instances of games with rules were noted in the outdoor environment within the individual or parallel social categories.

The results of no games with rules in the solitary and parallel social categories are not surprising. Very few games with rules are played on an individual level. Solitaire and jacks are two possible games that might be observed as games with rules on an individual or parallel social level. However, it is questionable whether children at this level have the interest or maturity to play them. In addition, games with rules played on an individual or parallel level require specific materials that were obviously absent.

Piaget (1962) postulated that games with rules belong mainly to the concrete operations period from approximately age 7 to 11. years. A review of cross-sectional and longitudinal data (Rubin et al., 1983) lends support to the hypothesis that games with rules become increasingly evident from the early to late preoperational period, 6 to 7 years. The observational information provided by the current study seems to validate the fact that games with rules are more characteristic of older children.

It is interesting to note that subjective observations by the authors indicate that play observed and categorized in the cognitive classification of games with rules was most often organized by adults and not independently initiated by the children. This occurred in the form of adults gathering children to jump rope or to participate in other structured and goal oriented activities. The ability to engage in games with rules appears to be an emerging skill in the children of this study that was only apparent when organized by adults.

An analysis of the social categories revealed that solitary play is more common indoors than outdoors, with significant differences being noted in both the observation only method and observation/interview methods. Both data collection methods also indicated that parallel play and group play occurred more frequently indoors than outdoors at a significant level. This outcome seems to indicate that the outdoor environment is more likely to encourage the associative and cooperative activities that have proven to be effective in facilitating educational progress in older students.

Data on the nonplay categories showed that activities were more likely to occur during free play indoors than outdoors. As with constructive play this outcome may be explained by the fact that alternatives to free play are

more available indoors than outdoors. Although the indoor environment offers the opportunity to read books, to use the computer, or to listen to music, the options available outdoors were more limited including such activities as getting a drink or putting balls away.

Behavior classified as unoccupied, onlooker, and transition occurred more often indoors than outdoors, especially to a greater degree in the observation/interview data collection method. Apparently the children in the current study were more active outdoors than indoors. This initial outcome would be a trend worthy of more research.

In the current study, time sampling of short durations (15 seconds) well separated from each other were chosen. In addition to preserving the statistical independence of data, this method was chosen because with maximum efficiency it would have allowed for a large quantity of data collected. In the 30 - minute play periods incorporated into the kindergarten program in this study, each child could have been observed once every 7.5 minutes. In reality this frequency of potential observation proved to be impossible. In the observation/interview condition, additional time was required because the observer had to circulate among the children to ask questions. In the interest of establishing rapport with the children and comfort to answer questions, the observers found a need to move up to the child slowly and to watch for times longer than 15 seconds. Moving rapidly through the classroom and asking questions without the additional time seemed to make the children uncomfortable and reluctant to answer questions. In both data collection conditions, additional time proved necessary to locate the target child being observed as well as to code data and to deal with the 30 data collection sheets.

Within the constraints of the school year and the time available from the observers participating in this study, a mean number of 40 observations for each child across both environments and both data collection conditions was achieved. However, as Krasnor and Pepler (1980) have noted, multiple time samples of short duration tend to fracture play episodes into something like still photos. These "photos" may give a fractured representation of play. Using observation periods of longer duration might show entirely different characteristics. Christie and Johnson (1987) stated that it is not unusual for a child to play constructively for a time and then to use the construction in dramatic play. Any observational method used would be a compromise

between collecting sequential and durational information on one hand while collecting more samples with statistical independence on the other. This situation leads to a need to collect a variety of observation data to arrive at a true picture of how play varies in young children.

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